

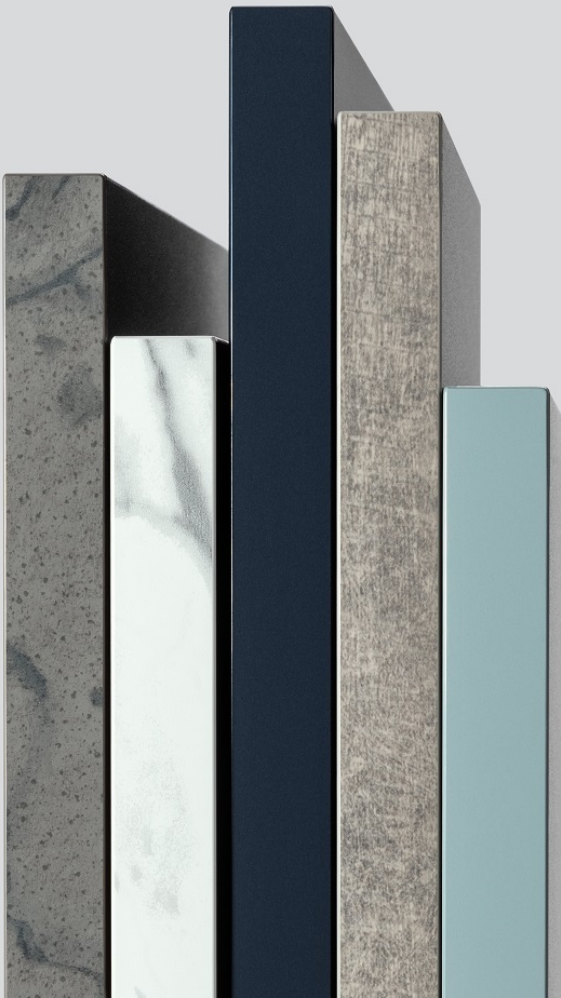
ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804+A2

Owner of the Declaration	REHAU Industries SE & Co. KG
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-REH-20240111-IBI2-EN
Issue date	08.07.2024
Valid to	07.07.2029

RAUKANTEX PP
REHAU Industries SE & Co. KG

www.ibu-epd.com | <https://epd-online.com>



1. General Information

REHAU Industries SE & Co. KG

Programme holder

IBU – Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Declaration number

EPD-REH-20240111-IBI2-EN

This declaration is based on the product category rules:

Decorative board for interior use, 01.08.2021
(PCR checked and approved by the SVR)

Issue date

08.07.2024

Valid to

07.07.2029



Dipl.-Ing. Hans Peters
(Chairman of Institut Bauen und Umwelt e.V.)



Florian Pronold
(Managing Director Institut Bauen und Umwelt e.V.)

RAUKANTEX PP

Owner of the declaration

REHAU Industries SE & Co. KG
Helmut-Wagner-Straße 1
95111 Rehau
Germany

Declared product / declared unit

1 kg edgeband of the type RAUKANTEX PP

Scope:

The EPD applies to the extruded PP-based edgebands of the following types:

- RAUKANTEX decor
- RAUKANTEX decor pro
- RAUKANTEX color
- RAUKANTEX color pro

produced in

- the REHAU plant in Rehau, Germany.

All of the declared products are produced by the company

- REHAU Industries SE & Co. KG.

This is a representative EPD declaring the above mentioned products by means of a representative product variant.

The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

The EPD was created according to the specifications of EN 15804+A2. In the following, the standard will be simplified as *EN 15804*.

Verification

The standard EN 15804 serves as the core PCR

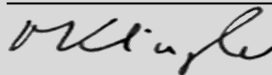
Independent verification of the declaration and data according to ISO 14025:2011

☐

internally

☒

externally



Matthias Klingler,
(Independent verifier)

2. Product

2.1 Product description/Product definition

The EPD applies to the extruded PP-based edgebands of the following types:

- RAUKANTEX decor (PP, pure)
- RAUKANTEX decor pro (PP)
- RAUKANTEX color (PP, pure)
- RAUKANTEX color pro (PP)

produced in the REHAU plant in the city of Rehau, Germany.

The above terms in brackets are not part of the official product name, but are intended to distinguish between the different types of edgebands. Due to the variety of possible applications and designs of the carrier panels there is also a great variety of edgeband designs. The declared edgebands vary with regard to their contact layers to the carrier material (pure: bonding agent layer, pro: functional polymer layer) as well as with regard to their surface designs (color: single-color edgeband with an additional finish, where appropriate, decor: gravure print layer with an additional finish).

The representative furniture edgeband variant, which forms the basis for this environmental product declaration is:

- RAUKANTEX decor (PP, pure) with a band width of 23 mm and a band thickness of 1.2 mm.

The edgebands are produced in Germany. The products are used worldwide, with a focus on Europe.

For the use of the products the relevant provisions at the place of use shall apply.

2.2 Application

The products are furniture edgebands to cover the cutting edges of carrier panes in the furniture industry. They are designed for indoor usage and provided with specific stabilisation.

2.3 Technical Data

The technical data of the products within the scope of the EPD are given with reference to the underlying validation rules of the individual data.

The performance values of the product with regard to its features shall apply according to the relevant technical provision.

Name	Value	Unit
Gross density PP	>900 (PP)	kg/m ³
Impact test; Hardness Shore D acc. to ISO 48-4	75±4	-
Vicat softening temperature acc. to ISO 306, method B/50	ca. 100	°C
Lightfastness acc. to ISO 4892-2, method B, Grey scale assessment ISO 105-A02	≥ 6	level

2.4 Delivery status

The width and thickness of an edgeband varies according to customer requirements and design. The edgeband can be manufactured in a width of between 14 mm and 104 mm and a thickness of between 0.4 mm and 5 mm.

The edgeband is rolled up in a length of between 50 m and 800 m per roll and is delivered in the form of several rolls per pallet.

2.5 Base materials/Ancillary materials

Main constituents of the edgeband

The following table shows the percentages of the main constituents of the edgebands to be examined. The percentages may vary depending on the design and dimensions, in individual cases even outside the mentioned range. As a basic polymer polypropylene is contained as part of the colour master batch and the contact layer. The total polymer percentage varies between 88 % and 91 % depending on the variant.

Name	Value	Unit
Basic polymer (PP)	65 - 79	%
Color master batch (fillers, additives, pigments)	14 - 21	%
Contact layer (bonding agents, functional polymer, additives)	2 - 18	%
Gravure print and lacquer layer (paint, adhesive, lacquers)	1 - 4	%

1) The product/manufacture/at least a partial product does not contain any substances on the ECHA candidate list of substances of very high concern (SVHC) according to the regulation of chemicals (EC) No. 1907/2006 (dated 14 June 2023) above 0.1 % by weight.

2) The product/manufacture/at least a partial product does not contain any further CMR-substances of category 1A or 1B that are not on the candidate list according to the regulation of chemicals (EC) No. 1907/2006 above 0.1 % by weight in at least one partial product.

3) No biocidal products have been added to the present construction product and it has not been treated with biocidal products (thus it is not referred to as a treated product pursuant to the Biocidal (EU) No. 528/2012).

2.6 Manufacture

For manufacturing the edgebands the required materials are melted in an extruder and formed by means of a tool. Then the edgeband is calibrated and cooled down.

Subsequently, the bonding agent layer and the functional layer, respectively, is applied to the calibrated edge. For the variants RAUKANTEX decor the gravure print layer is then applied, followed by a drying procedure. Finally, the selected lacquer layer, as appropriate, is applied on all variants, the edgeband is again cooled down, rolled up, is subjected to a quality check and is finally packed.

The production steps may differ depending on the design of the edgeband.

In the REHAU plant in the city of Rehau a certified quality management system according to ISO 9001 is in place.

2.7 Environment and health during manufacturing

The legal provisions concerning the handling of exhaust air, sewage, waste and noise emission are met or even undercut. There aren't any health risks for the employees during manufacturing.

In the REHAU plant in the city of Rehau a certified environmental management system according to ISO 14001 is in place.

2.8 Product processing/Installation

Depending on the design different machines are used to apply the edgeband to the carrier materials:

- With the variant RAUKANTEX pure customary edgebanders can be used to bond the edgebands to the piece of furniture using a hot-melt adhesive layer.
- With the variant RAUKANTEX pro the edgebands can be applied to the piece of furniture in edgebanders using CO₂ or diode lasers, hot air or NIR processes. By melting the functional layer during bonding the attachment of the edgeband without any visible joint can be reached (also known as 'zero-joint').

2.9 Packaging

The edgebands can be packed in two different ways: When they are packed as loose rolls they are stacked on transport pallets. To protect the products corrugated board is used as a protective layer to the pallet and plastic film is used for wrapping. Additionally, the stack is fixed by means of cover boards and PET-strapping. For cardboard packaging no plastic film or corrugated board is needed, as (upon customer's request) the rolls are stacked on the pallets in cardboard boxes.

The transport pallets can be reused, as appropriate, paper and plastic packaging can be recycled or disposed according to local provisions.

2.10 Condition of use

The polymers used for the edgebands are stabilized and resistant to ageing (according to the technical information which is online available).

2.11 Environment and health during use

There is no evidence of any causal relationships between the edgebands and environment or health during the service life.

2.12 Reference service life

For the edgebands themselves a service life of at least 15 years can be assumed. The actual service life depends on the respective piece of furniture and its usage environment.

2.13 Extraordinary effects

Fire

Information on building material classes according to EN 13501-1 is not useful for the edgeband itself. Upon joining the

edgeband with the respective piece of furniture it becomes an integral part of it. Therefore, the building material class can only be determined in conjunction with the piece of furniture and the adhesive used.

Water

In case of the edgeband being accidentally exposed to water no adverse impacts on humans and environment can be expected.

Mechanical destruction

In case of an accidental mechanical destruction of the edgeband no adverse impacts on humans and environment can be expected.

2.14 Re-use phase

The possibility of re-using the edgebands primarily depends on the piece of furniture to which they belong. If the piece of furniture comes to the end of its service life, it can together with the edgeband either be materially recycled or thermally recycled with energy recovery.

With the so-called ReTurn concept REHAU is offering a return concept for not yet processed edgebands and processing waste.

2.15 Disposal

In case re-usage or recycling is not possible the edgeband can be disposed of via landfill as part of the piece of furniture. Waste code according to the European Waste Catalogue (EWC):
20 03 07 Bulky waste

2.16 Further information

For further information see the product website and the technical data sheets under:

Product website: <https://interior.rehau.com/de-de/produkte/raukantex-moebelkanten>

Downloads: <https://www.rehau.com/de-de/service/download/82020?query=&divisionLevel1=27458&divisionLevel2=69262&categoryLevel1=27436&mimeType=&sort=freshness>

3. LCA: Calculation rules

3.1 Declared Unit

The declared unit is '1 kg of edgeband of the type RAUKANTEX PP'.

Conversion to grammage and density differs depending on dimension, design of the contact surface and surface of the edgebands. The data given herein refer to the representative furniture edgeband RAUKANTEX decor (PP pure) forming the basis for the lifecycle assessment.

Name	Value	Unit
Declared unit	1	kg
Area	0,868	m ²
Density	960.2	kg/m ³
Thickness	1,2	mm
Grammage	1.152	kg/m ²

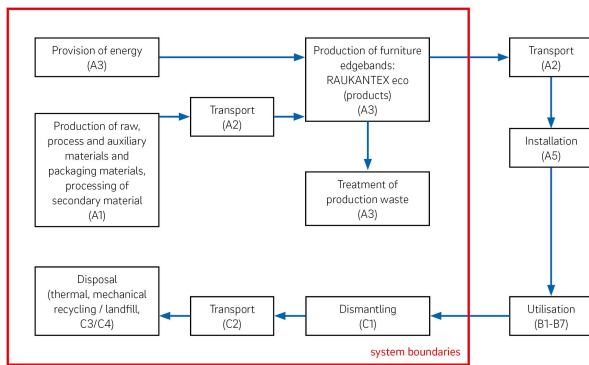
Further declared units are permitted subject to the conversion being presented in a transparent way.

Declared unit

3.2 System boundary

EPD type: Cradle to gate (module A1–A3) with consideration of the disposal (module C1 to C4) and the benefits and loads from re-use (module D).

The following flow diagram shows the system boundaries in the assessment of RAUKANTEX PP:



A1 - A3 Product phase

- Production of raw, operating and ancillary materials and transport to the respective plant
- Manufacturing of pre-products and packaging and transport to the respective plant
- Manufacturing and packaging of the edgebands
- Transport and processing of the waste from manufacturing and packaging

C1 - C4 Disposal

- EoL scenario 1 (recycling): dismantling of the edgeband in conjunction with the respective subsurface and subsequent material recycling (module C3/1 and D/1 in the assessment).
- EoL scenario 2 (energy recovery from waste): dismantling of the edgeband in conjunction with the respective subsurface and subsequent thermal recycling with energy recovery (module C3/2 and D/2 in the assessment).
- End-of-Life (EoL) scenario 3 (landfilling): dismantling of the edgeband in conjunction with the respective subsurface and subsequent landfilling (module C4/3 and D/3 in the assessment).

In case of material recycling of the edgeband at the end of its lifecycle the impact of recycling up to and including "grinding" is allocated to the edgeband. As a ground material the recyclate loses its waste status and is leaving the system boundaries.

D Re-use, Recovery and/or Recycling potentials

The disposal scenarios provide re-use, recovery or recycling potentials with the edgebands being partly subjected to energy and material recovery, respectively, from which energy and secondary materials, respectively, can be recovered, which can subsequently be used beyond the system boundaries.

3.3 Estimates and assumptions

REHAU Industries SE & Co. KG provided the primary data on the composition of the edgebands as well as the data regarding energy use, transport routes and packaging of the product and of raw materials. In case of existing data gaps these have been filled with statistical average values and empirical values.

For the production in the REHAU plant in the city of Rehau the energy consumption has been calculated on the basis of green electricity, any other energy consumption on the basis of the German residual mix. The percentage of the energy consumption covered by green electricity to the total energy consumption in the REHAU plant is 100 %.

For module D it is assumed that the recyclate beyond the system boundaries can replace only 50 % of the polymer virgin material. Thus, a substitution factor of 0.5 is included in the benefits from the re-use of secondary material.

While the manufacture of the edgebands takes place in Germany their usage can be worldwide. However, the focus is on Europe. The processing at the end of the lifecycle depends on the place of usage. Thus, a European scenario at the end of the lifecycle was assumed for modelling.

3.4 Cut-off criteria

In the present EPD all known inputs and outputs were included in the assessment. Due to the very limited relevance individual processes and materials, respectively, with no data available were excluded. Any processes excluded from the assessment account for a respective weight and energy percentage of <1 % and a common weight and energy percentage of <5 % with regard to the declared unit.

The following processes have been excluded:

- For disposable packaging for raw materials and for the end product the transport of the packaging itself has been excluded.
- For reusable packaging the manufacturing and processing processes have been excluded.

3.5 Background data

For the lifecycle assessment only background data from the *database* Managed LCA Content by Sphera (version 2024.1, formerly GaBi-Datenbank) has been used. The modelling has been carried out with the *software* LCA for Experts by Sphera (version 10.8, formerly GaBi).

3.6 Data quality

The specific foreground data for the manufacture of RAUKANTEX has been provided by REHAU Industries SE & Co. KG. The geographical and technical representativeness has been rated very good. The temporal representativeness has been rated good to very good. In total far more than 80 % of the specific data have been assessed as good to very good.

The background data from the database Managed LCA Content demonstrates a good to very good representativeness (geographical, technical, temporal) of at least 80 % of all key indicators.

3.7 Period under review

The specific data regarding the manufacture of RAUKANTEX was collected for the production year 2021 (January to December 2021).

3.8 Geographic Representativeness

Land or region, in which the declared product system is manufactured, used or handled at the end of the product's lifespan: Germany

3.9 Allocation

Module A1-A3:

During the manufacture of RAUKANTEX no further by-products occur. In determining the energy consumption of the edgebands the energy measured has been allocated pro rata among the produced tonnage of RAUKANTEX products.

3.10 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to *EN 15804* and the building context, respectively the product-specific characteristics of performance, are taken into account. Background database: Managed LCA Content by

4. LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

The weight of the biogene carbon bound in the edgeband is less than 5 % of the product weight. Thus, detailed information is not required here. The product packaging used contains wood and corrugated board. According to the background dataset wood has a content of 43.5 % biogene carbon per kg wood. According to the background dataset corrugated board has a content of 43 % biogene carbon per kg corrugated board.

Biogene carbon content of the product and its packaging at the factory gate

Name	Value	Unit
Biogene carbon in the product	<0,05	kg C / d.u.
Biogene carbon in the product packaging	0,023	kg C / d.u.

In order to not affect the results of the lifecycle assessment by the biogene carbon bound in the product packaging, the biogene CO₂ bound in the product packaging is not included in the assessment in the product phase A1–A3.

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg of CO₂.

The following technical information forms the basis for the declared modules or can be used for developing specific scenarios in the context of a building evaluation, if modules are not declared (MND).

Installation at the construction site (module A5):

Module A5 is not part of the system boundaries of this lifecycle assessment. Thus, the disposal of the product packaging from the construction site is not included in the assessment. The product packaging of RAUCANTEX PP comprises (related to the declared unit):

- 0.042 kg wooden pallets and covering boards (one-way)
- 0.010 kg corrugated board (one-way)
- 5.73E-04 kg PET-strapping (one-way)
- 1.77E-04 kg labels (one-way)
- 9.54E-04 kg LDPE-film (one-way)

EoL scenario 1: 100 % recycling

Together with the attached piece of furniture the edgeband is manually taken out of the building without using any mechanical energy. Thus, no emissions are generated in the

module C1.

The edgeband is transported by van over a distance of 77 km to a local recycler (module C2). There the edgeband material is recycled and processed into ground material. This entails 10 % of rejects, which are thermally recycled with energy recovery (module C3/1). From the possible utilisation of the ground material instead of virgin material benefits and loads beyond the system boundaries result. A substitution factor $S = 0.5$ takes into account that virgin material can only partly be substituted by ground material. Additional benefits are gained by the utilisation of energy from the combustion of the rejects (D/1).

Name	Value	Unit
Deposited waste (in landfills)	0	kg
Exported electrical energy	0,186	kWh
Exported thermal energy	1,19	MJ
Re-usable recycling material (with substitution factor $S=0.5$)	0,450	kg

EoL scenario 2: 100 % energetic recovery

The modules C1 and C2 are identical to EoL scenario 1. At a local recycler the edgeband is thermally recycled with energy recovery (module C3/2). From the possible utilisation of the recovered energy benefits and loads beyond the system boundaries result (D/2).

Name	Value	Unit
Deposited waste (in landfills)	0	kg
Exported electrical energy	1,86	kWh
Exported thermal energy	11,9	MJ
Re-usable recycling material (with substitution factor $S=0.5$)	0	kg

EoL scenario 3: 100 % landfilling

The modules C1 and C2 are identical to EoL scenario 1. The edgeband is deposited at a local landfill (module C4/3). No benefits or loads result from the re-use beyond the system boundaries (module D/3).

Name	Value	Unit
Deposited waste (in landfills)	1	kg
Exported electrical energy	0	kWh
Exported thermal energy	0	MJ
Re-usable recycling material (with substitution factor $S=0.5$)	0	kg

5. LCA: Results

In the following the results of the lifecycle assessment and the impact assessment for the RAUKANTEX PP edgeband to be examined are listed in detail. The EoL scenario 1 (100 % recycling) comprises the modules C1, C2, C3/1 and D/1, the EoL scenario 2 (100 % energetic recycling) comprises the modules C1, C2, C3/2 and D/2 and the EoL scenario 3 (100 % landfilling) comprises the modules C1, C2, C4/3 and D/3. In the relevant scenarios the modules C4/1, C4/2 and C3/3 have no relevance and are thus not shown in the result table.

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)

Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundaries
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	MND	MND	MND	MND	MNR	MNR	MNR	MND	MND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 kg Möbelkante

Parameter	Unit	A1-A3	C1	C2	C3/1	C3/2	C4/3	D/1	D/2	D/3
GWP-total	kg CO ₂ eq	2.52E+00	0	6.96E-03	3.86E-01	3.13E+00	2.94E-02	-1.02E+00	-1.5E+00	0
GWP-fossil	kg CO ₂ eq	2.49E+00	0	6.79E-03	3.86E-01	3.13E+00	2.94E-02	-1.02E+00	-1.49E+00	0
GWP-biogenic	kg CO ₂ eq	2.81E-02	0	3.88E-05	2.56E-05	7.9E-05	0	-5.02E-03	-6.02E-03	0
GWP-luluc	kg CO ₂ eq	2.19E-03	0	1.31E-04	8.13E-06	6.27E-06	1.08E-04	-3.1E-04	-1.04E-03	0
ODP	kg CFC11 eq	6.11E-11	0	2.14E-15	2.08E-14	1.66E-13	9.7E-14	-2.88E-12	-1.7E-14	0
AP	mol H ⁺ eq	4.38E-03	0	1.01E-05	1.29E-04	3.12E-04	1.76E-04	-1.38E-03	-1.95E-03	0
EP-freshwater	kg P eq	1.27E-05	0	1.85E-08	2.3E-08	3.57E-08	1.69E-05	-1.39E-06	-1.96E-06	0
EP-marine	kg N eq	1.27E-03	0	3.75E-06	3.34E-05	6.71E-05	3.79E-05	-3.95E-04	-5.58E-04	0
EP-terrestrial	mol N eq	1.35E-02	0	4.49E-05	4.37E-04	1.48E-03	4.16E-04	-4.19E-03	-5.98E-03	0
POCP	kg NMVOC eq	5.27E-03	0	9.76E-06	9.55E-05	2E-04	1.21E-04	-1.67E-03	-1.57E-03	0
ADPE	kg Sb eq	5.31E-07	0	1.16E-09	1.08E-09	1.72E-09	1.95E-09	-9.78E-08	-2.49E-07	0
ADPF	MJ	7.77E+01	0	8.91E-02	1.06E+00	3.62E-01	4.97E-01	-3.34E+01	-2.61E+01	0
WDP	m ³ world eq deprived	1.8E-01	0	4.86E-05	3.47E-02	2.89E-01	3.8E-03	-5.8E-02	-1.13E-01	0

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential)

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 kg Möbelkante

Parameter	Unit	A1-A3	C1	C2	C3/1	C3/2	C4/3	D/1	D/2	D/3
PERE	MJ	2.49E+01	0	9.86E-03	5.81E-02	1.05E-01	7.51E-02	-2.09E+00	-5.84E+00	0
PERM	MJ	5.65E-04	0	0	-5.65E-04	-5.65E-04	0	0	0	0
PERT	MJ	2.49E+01	0	9.86E-03	5.75E-02	1.05E-01	7.51E-02	-2.09E+00	-5.84E+00	0
PENRE	MJ	7.83E+01	0	8.91E-02	4.79E+00	3.77E+01	4.97E-01	-3.34E+01	-2.61E+01	0
PENRM	MJ	3.73E+01	0	0	-3.73E+01	-3.73E+01	0	0	0	0
PENRT	MJ	1.16E+02	0	8.91E-02	-3.25E+01	3.62E-01	4.97E-01	-3.34E+01	-2.61E+01	0
SM	kg	0	0	0	0	0	0	9E-01	0	0
RSF	MJ	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0
FW	m ³	1.34E-02	0	9.21E-06	8.19E-04	6.77E-03	7.01E-06	-3.86E-03	-5.69E-03	0

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA - WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2:

1 kg Möbelkante

Parameter	Unit	A1-A3	C1	C2	C3/1	C3/2	C4/3	D/1	D/2	D/3
HWD	kg	2.96E-05	0	4.34E-12	1.38E-10	2.18E-10	1.23E-10	-4.3E-09	-5.87E-09	0
NHWD	kg	4.57E-02	0	1.51E-05	1.52E-03	1.24E-02	9.96E-01	-8.54E-03	-1.22E-02	0
RWD	kg	6.49E-04	0	1.42E-07	8.51E-05	2.08E-05	7.01E-06	-3.54E-04	-1.87E-03	0
CRU	kg	0	0	0	0	0	0	0	0	0
MFR	kg	1.3E-01	0	0	9E-01	0	0	0	0	0

MER	kg	0	0	0	0	0	0	0	0	0
EEE	MJ	9.74E-02	0	0	6.68E-01	6.68E+00	0	0	0	0
EET	MJ	2.23E-01	0	0	1.19E+00	1.19E+01	0	0	0	0

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional:

1 kg Möbelkante

Parameter	Unit	A1-A3	C1	C2	C3/1	C3/2	C4/3	D/1	D/2	D/3
PM	Disease incidence	4.87E-08	0	1.03E-10	1.09E-09	1.82E-09	1.82E-09	-1.24E-08	-1.68E-08	0
IR	kBq U235 eq	9.74E-02	0	1.5E-05	7.97E-03	3.33E-03	9.61E-04	-5.24E-02	-3.06E-01	0
ETP-fw	CTUe	4.26E+01	0	6.92E-02	1.58E-01	1.49E-01	1.08E+00	-1.63E+01	-3.6E+00	0
HTP-c	CTUh	1.24E-09	0	1.38E-12	7.78E-12	2.04E-11	1.6E-11	-3.92E-10	-2.48E-10	0
HTP-nc	CTUh	3.45E-08	0	5.81E-11	2.35E-10	1.34E-10	3.34E-10	-1.48E-08	-7.97E-09	0
SQP	SQP	3.81E+01	0	5.93E-02	9.89E-02	1.17E-01	8.43E-02	-1.43E+00	-4.01E+00	0

PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index

Disclaimer 1 – for the indicator “Potential Human exposure efficiency relative to U235”. This impact category deals mainly with the eventual impact of low-dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure or radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, radon and from some construction materials is also not measured by this indicator.

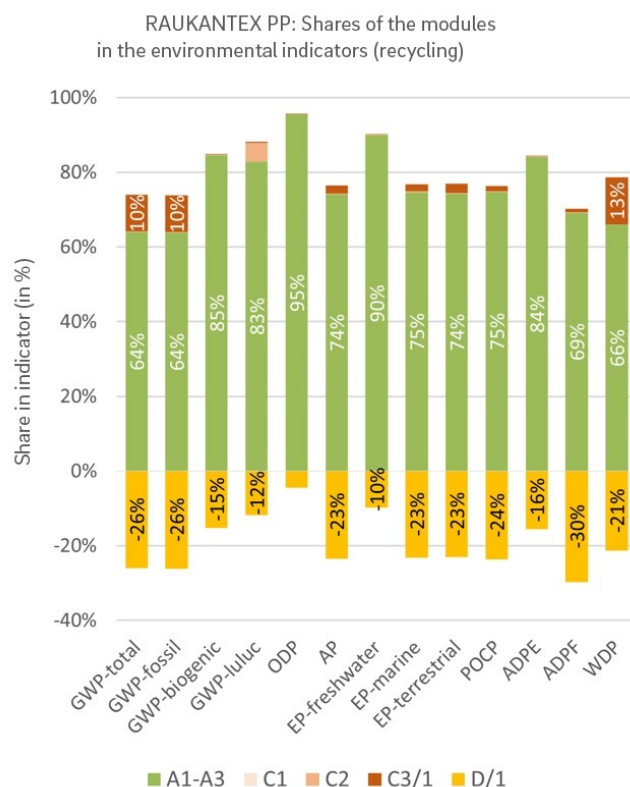
Disclaimer 2 – for the indicators “abiotic depletion potential for non-fossil resources”, “abiotic depletion potential for fossil resources”, “water (user) deprivation potential, deprivation-weighted water consumption”, “potential comparative toxic unit for ecosystems”, “potential comparative toxic unit for humans – cancerogenic”, “Potential comparative toxic unit for humans - not cancerogenic”, “potential soil quality index”. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high as there is limited experience with the indicator.

6. LCA: Interpretation

The following section provides an interpretation of the results of the lifecycle assessment. The graphical representation shows the percentage share of the module in the core indicators for the different EoL scenarios: For RAUKANTEX PP the majority of the core indicators concerning environmental impacts is dominated by the product phase (modules A1–A3). This equally applies to the majority of indicators concerning the use of resources, outputs, wastes and optional indicators

Share of the modules in environmental indicators in the EoL scenario 1:

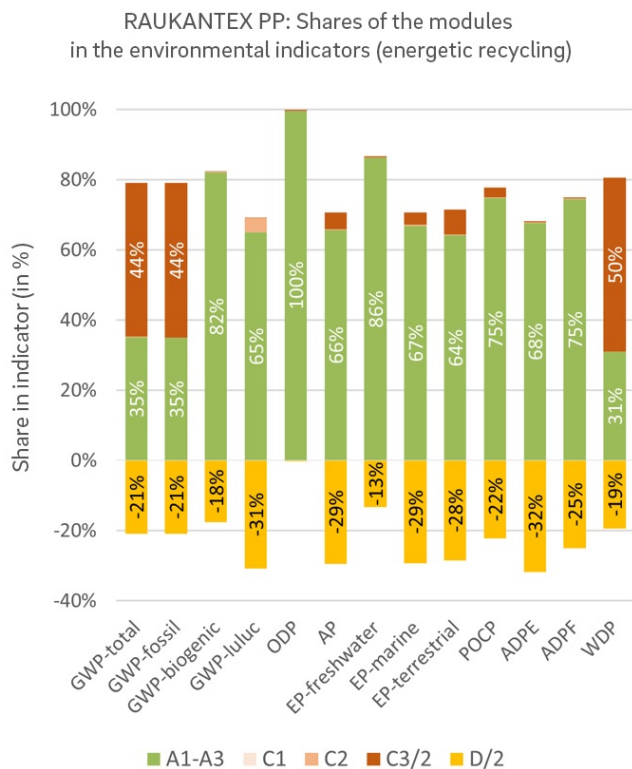
For material recycling in the EoL (scenario 1) manufacturing accounts for the largest share in all core indicators. The processing of waste at the end of life stage (C3/1) only contributes a one-digit percentage to the environmental impact. The possible benefits of re-use, especially of the secondary material in a subsequent product, account for up to 30 % of the impacts within the system boundaries.



Share of the modules in environmental indicators in the EoL scenario 2:

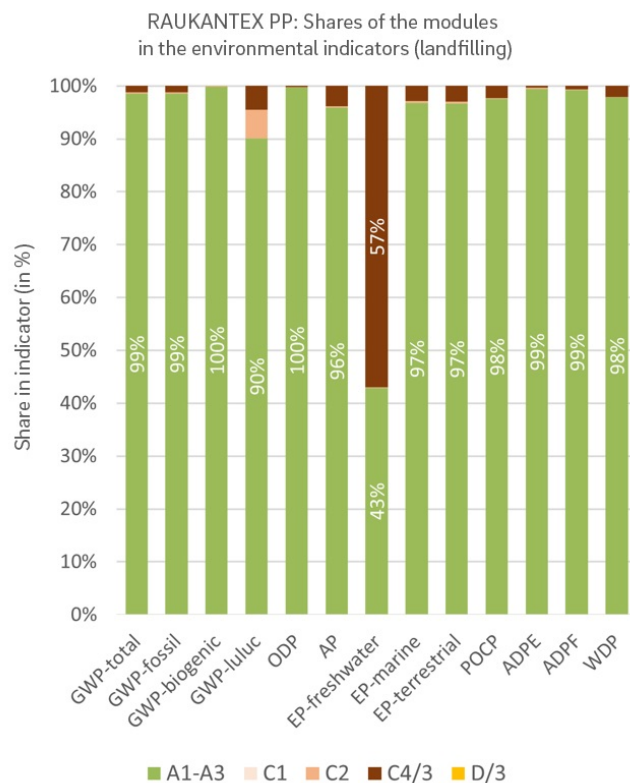
With the energetic recycling at the end of the lifecycle (scenario 2) the combustion of the waste in C3/2 takes in a dominating share of the total and fossil Global Warming Potential (GWP_{total} and GWP_{fossil}) and of the WDP. All other core indicators are dominated by manufacturing. The possible benefits of re-use of

thermal and electrical energies account for 21 % with the GWP_{total} , 29 % with the Acidification Potential (AP), 29 % with the Eutrophication Potential, marine (EP_{marine}) and 32 % with the Abiotic Depletion Potential – non fossil resources (ADPE).



Shares of the module in environmental indicators in the EoL scenario 3:

In the EoL scenario 3 (100 % landfilling) the product phase A1-A3 dominates in nearly all core indicators. An exception to this is the Eutrophication Potential, freshwater ($EP_{freshwater}$), where the landfilling of the waste dominates the indicator.



Influences on environmental impacts in the product phase (A1–A3):

For RAUKANTEX PP the polypropylene dominantly influences the majority of the core indicators in the product phase. It is especially dominant with regard to the GWP_{total} with 78 % and the ADPF with 89 %. Also in the indicators AP (61 %), EP_{marine} and $EP_{terrestrial}$ (60 % each), POCP (65 %) and WDP (58 %) it accounts for more than half of the environmental impact. This is due on one hand to the high content by weight of the basic polymer polypropylene and on the other hand to the fossil origin and the strong environmental impact related to it. Furthermore, the energy demand for manufacturing plays a dominant role in the indicators ODP (69 %), $EP_{freshwater}$ (65 %) and ADPE (51 %).

Sensitivity analysis with regard to differences of the product variants in the product phase (A1–A3) concerning the GWP_{total} :

Due to differences in manufacturing the different product variants of the edgeband to be examined show deviations from the representative variant RAUKANTEX decor (PP pure). These are given in the table below. Within the material group PP there are only minor deviations in the GWP_{total} in the manufacturing phase with values between -1.4 % and 5.6 %. The decisive factors are the choice of the type of surface design (RAUKANTEX decor and RAUKANTEX color) and of the functional layer (RAUKANTEX pure or RAUKANTEX pro) as well as the quantity of rejects in manufacturing.

RAUKANTEX PP variant	Deviation from the representative product
RAUKANTEX decor (PP pure)	0 %
RAUKANTEX decor pro (PP)	-0.2 %
RAUKANTEX color (PP pure)	-1.4 %
RAUKANTEX color pro (PP)	5.6 %

7. Requisite evidence

In general the health-related evaluation of Building Product Emissions for edgebands should be carried out in combination with the corresponding carrier panel and the adhesive used.

Thus, no information is provided here on building product

emissions, as these should be collected in combination with the carrier material.

8. References

Standards:

EN 15804

EN 15804:2012+A2:2019+AC:2021, Building Sustainability — Environmental Product Declarations — Basic Rules for the Product Category of Building Products.

ISO 14025

EN ISO 14025:2011, Environmental labels and declarations - Type III environmental declarations - Principles and procedures.

ISO 14040

EN ISO 14040:2006, Environmental Management - Life Cycle Assessment - Principles and Framework.

ISO 14044

EN ISO 14044:2006, Environmental Management - Life Cycle Assessment - Requirements and Guidelines

Further References:

General Instruction

Institut Bauen und Umwelt e. V (2022): General Instructions for the EPD programme of Institut Bauen und Umwelt e. V. Version 2.1.

PCR Part A

Institut Bauen und Umwelt e. V (2022): Product Category Rules for Building-Related Products and Services, Calculation Rules

for the Life Cycle Assessment and Requirements on the Project Report according to EN 15804+A2:2019. Version 1.3.

PCR Part B

Institut Bauen und Umwelt e. V (2023): PCR Instructions for building related products and services. Part B: Requirements to the EPD for decorative panels for indoor application. Version 1

Product information and downloads RAUKANTEX

REHAU Interior Solutions (2023): RAUKANTEX edgeband - <https://interior.rehau.com/de-de/produkte/raukantex-moebelkanten> (retrieved on 29/12/2023).

Title of the software/database:

Database

Managed LCA Content (formerly GaBi-Datenbank), Version 2024.1. Chicago (USA): Sphera Solutions, Inc. (last access on 12/06/2024).

Software

LCA for Experts (formerly GaBi), Version 10.8. Chicago (USA): Sphera Solutions, Inc. (last access on 12/06/2024).

**Publisher**

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